Drivers of copper availability in agriculturals soils receiving long-term applications of organic fertilizers

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Context
- Moderate but on-going and long-term contamination of agricultural soils fertilized with organic wastes (OW)
- High Cu toxicity for soil organisms

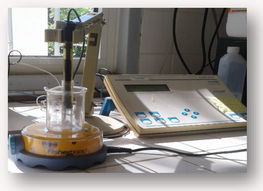
Scientific issue
- Lack of knowledge on effects of availability and bioavailability of Cu in such moderatly contaminated soils

Study's aim
→ Long-term consequences of recycling organic wastes on Cu availability under real field conditions

Material & Methods

- 4 types of soil: Andosol/ Cambisol/ Nitisol/ Arenosol
- 3 fertilsation types: No fertilizer/ Mineral fertilizer/ Organic fertilizer

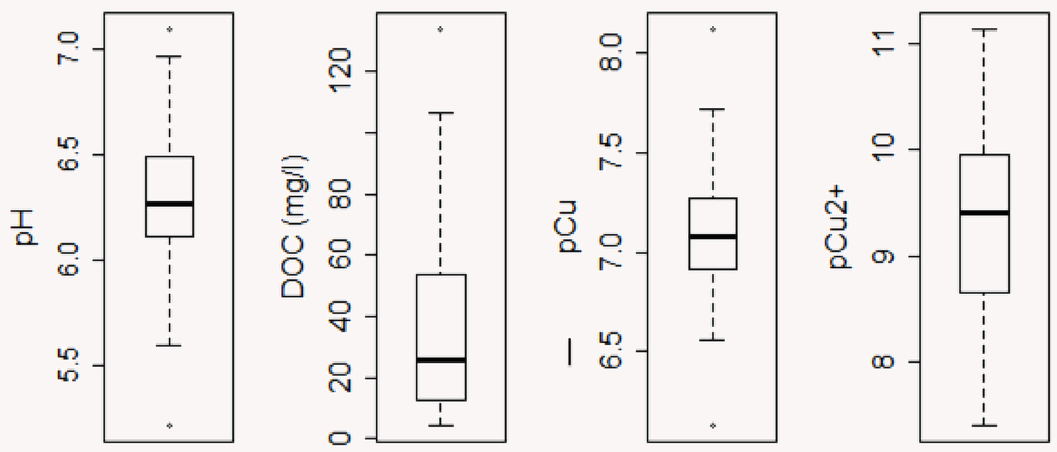
Soil solutions extraction (1:10 ratio)



pCu^{2+}: measure of Cu availability

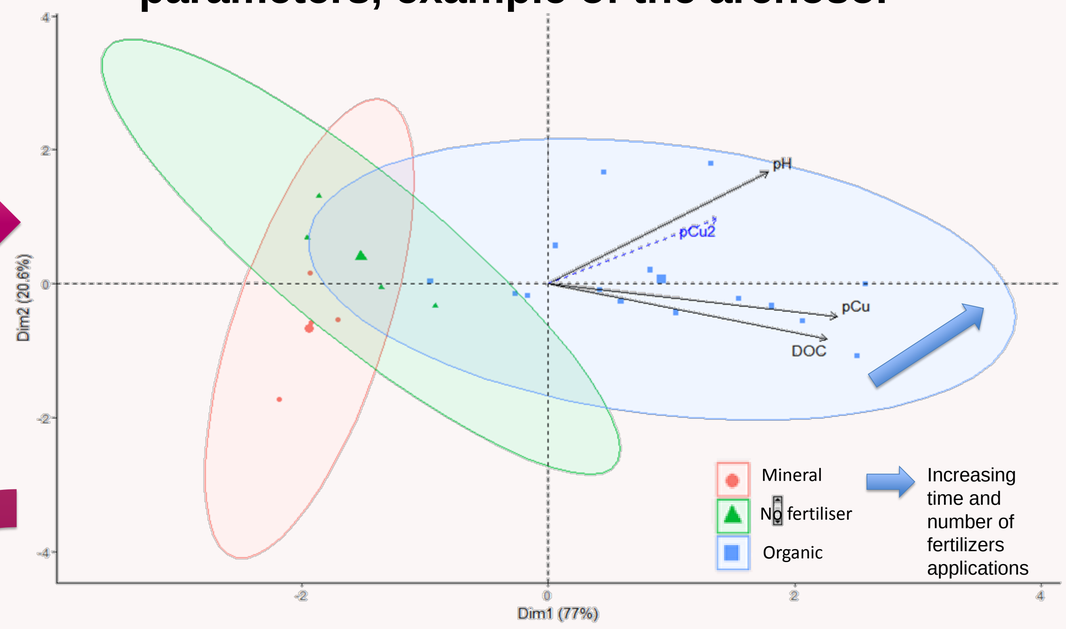
Other measurements
- pH
- Dissolved organic carbon (DOC)
- pCu = $\log_{10}$[Cu]total in soil solution

Range of pH, pCu, COD and pCu^{2+} in soil solutions (n = 94)



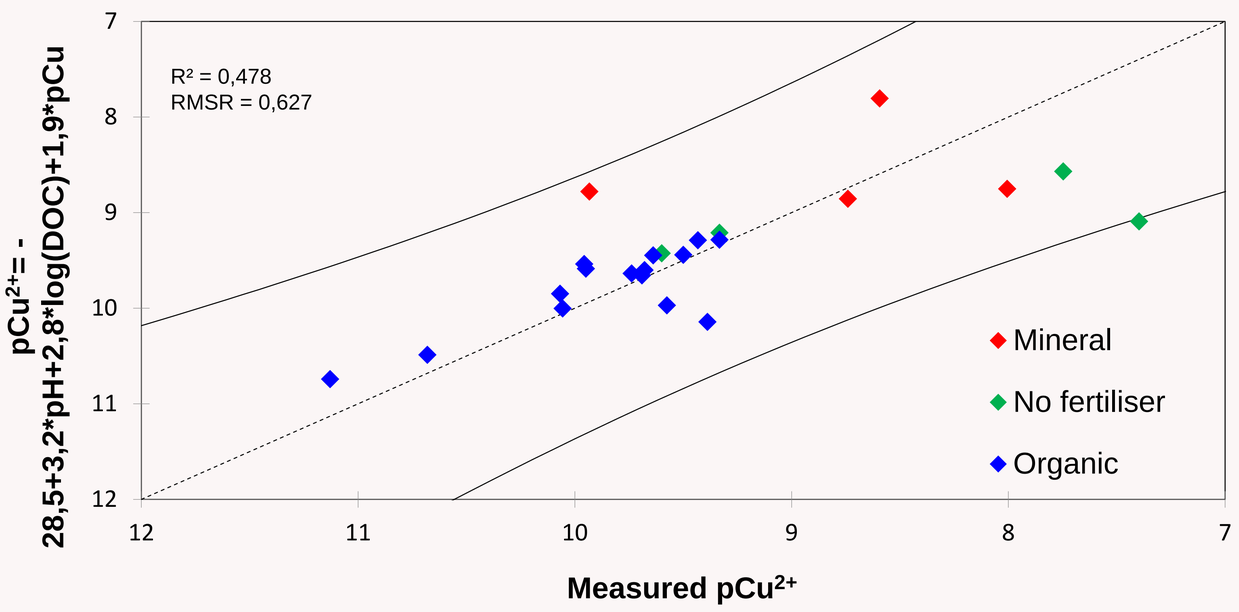
➡ Large variations of soil solution parameters

Impact of fertilization on soil solution parameters, example of the arenosol



➡ Long-term applications of organic fertilizers induced an increase in pH, DOC, pCu and pCu^{2+}

Impact of soil solution parameters on pCu^{2+}, example of the arenosol



➡ Soil solution parameters other than pH,DOC and pCu drove pCu^{2+}

Work in progress

Ecotoxicity assays

DGT (kinetic method)

RHIZOtest

Cu bioaccumulation in earthworms

Reference
Sauvé et al 2000
T.Djae et al 2017
ISO Norm 16198 - RHIZOtest